

Johns Hopkins Education and Research Center for Occupational Safety and Health

Annual Report: July 1, 2013-June 30, 2014



September 30, 2014

SECTION 1 – ERC Summary and Relevance

ERC Summary:

The Johns Hopkins Education and Research Center, the only ERC in Federal Region III, prepares leaders in occupational health and safety research and practice. Master's and doctoral (PhD, DrPH, and ScD) training is provided in Occupational and Environmental Hygiene (1.5-year MSPH; 4- to 5-year PhD and DrPH), Occupational and Environmental Health Nursing (1-year MPH; 1.5-year MSN/MPH; 4- to 5-year PhD and DrPH), Biomarkers of Occupational Exposure and Susceptibility (4- to 5-year PhD and DrPH), and Occupational Injury Epidemiology and Prevention (4- to 5-year PhD), in addition to residency training in Occupational and Environmental Medicine (2 years). Continuing Education and Outreach components bring the strengths of the core programs to practicing occupational health and safety professionals. A Pilot Project Research Training Program provides research study support to students and junior faculty at academic institutions within our region. On average per year, this ERC trains approximately eleven to eighteen students in occupational hygiene, five to seven students in occupational health nursing, four to five students in occupational medicine, five students in biomarkers research, and three to four students in occupational injury prevention, while our Continuing Education program reaches more than 1,000 students per year.

A strong interdisciplinary emphasis underlies all ERC training activities, and the importance of such interaction and collaboration is communicated to all students in courses, seminars, and discussions, and is reinforced through research and professional practice in each program. The excellence of the Occupational and Environmental Medicine and Occupational and Environmental Hygiene programs has been recognized through accreditation by their respective accrediting bodies. Each academic program upholds the strong research tradition of the school, and we strive to address the priority areas set by NIOSH in the National Occupational Research Agenda. Research activities in each academic program address topics relevant to the sector-based NORA focus. Our Pilot Project Research Training program also enables faculty and students to advance that agenda.

Relevance:

There are approximately 120 million workers in the United States whose work-related health, quality of life, and productivity are affected directly or indirectly by the expertise of health and safety professionals. The Johns Hopkins Education and Research Center for Occupational Safety and Health, through its interdisciplinary training mission, builds the national capacity to provide care, set policy, design and manage health and safety programs, and conduct research to advance the field of occupational safety and health.

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SECTION II – Program Highlights of High Impact

Occupational and Environmental Hygiene:

The Occupational and Environmental Hygiene training program: provides a high quality, interdisciplinary master's-level professional education with a research/problem-solving perspective; provides courses in occupational and environmental hygiene and related fields that are critical to the training of OEH students as well as those in other ERC programs and other disciplines; prepares graduate students for careers as independent investigators with OEH research skills; and serves as a resource regionally, nationally, and internationally. This program is accredited by the Accreditation Board for Engineering Technology. OEH program enrollments for the 2013-2014 academic year include twelve doctoral students, eighteen full-time MSPH students, and twenty online MSPH students. We graduated eight MSPH and four doctoral students in May 2014. Our online, part-time master's program continues to grow. We have increased offerings in our June Summer Institute. In addition, we have recruited four students for a Certificate Program in Occupational and Environmental Health.

Faculty members have extensive interdisciplinary research support and a productive publication record that frequently includes student co-authors. In the time period covered by this report, OEH program faculty had 29 ERC-related publications in the peer-reviewed literature, 10 of which included ERC students as co-authors. We are pleased to have recruited Dr. Kristen Koehler to join our OEH program faculty. Our faculty members are actively involved in continuing education—such as co-sponsoring the local American Industrial Hygiene Association's (AIHA's) Professional Development Conference—and our faculty also conduct extensive local, regional, national, and international outreach activities. Drs. Pat Breysse (OEH program director), Peter Lees, D'Ann Williams and Ana Rule are collaborators on a Fogarty Environmental Health Research Training Grant in Mongolia, for which they have designed and taught courses on occupational and ambient air sampling. Dr. Koehler served as secretary for the Aerosol Technology Committee of the American Industrial Hygiene Association, and serves as incoming vice chair of the Indoor Aerosol and Aerosol Exposure Working Group of the American Association for Aerosol Research. Dr. Williams serves as a member of the Agricultural Air Quality Task Force and as a member of the Maryland Environmental Health Network. Dr. Breysse chaired a NIOSH ERC training grant Special Emphasis Panel and as a member of the Accreditation Board for Engineering and Technology's accreditation academic advisory board. In support of research training, the primary OEH program faculty members have responsibility for approximately 4,000 square feet of laboratory space. The program also has access to many shared research facilities within the Department of Environmental Health Sciences, which provide important opportunities for doctoral research. OEH program faculty also participate in a wide range of interdisciplinary centers and institutes. These important collaborations and interactions provide opportunities to enrich student training and student research. A brief list of examples of such collaborations includes: Institute for Global Tobacco Control; Center for a Livable Future; Mid-Atlantic Public Health Training Center; Risk Sciences and Public Policy Institute; Urban Health Institute; and Institute for NanoBioTechnology.

Occupational and Environmental Health Nursing:

Student completion and enrollment in the Occupational and Environmental Health Nursing program is exceptional. One student completed the joint MSN/MPH OEHN program in December 2013 and took a nurse internship with the Occupational Safety and Health Administration (OSHA), while three other students—an MSN/MPH student, our first MPH/MBA student, and our DrPH student—completed their respective programs in spring 2014. In July 2013, we recruited one full-time and one part-time MSN/MPH student and one part-time distance MPH student (who lives in Guatemala) into the OEHN program. In December 2013, another part-time online student was recruited from Yakima, Washington. The ERC is facilitating several opportunities for interdisciplinary practice among ERC students. OEHN Director Dr. Sheila Fitzgerald serves as the faculty advisor for Bienestar, a student-led program involving students and faculty from the schools of public health, nursing, and medicine. Dr. Fitzgerald specifically mentors students involved with the tuberculosis screening program, a community outreach effort aimed at Latino workers and their families. Dr. Agnew mentors students at Casa de Maryland, a support organization for Hispanic day laborers. One of our OEHN students completed a nursing practicum and Capstone with the Migrant Clinicians Network in Salisbury, Maryland, to evaluate the effectiveness of a program designed to integrate environmental and occupational health into the primary care setting. A recent OEHN graduate (who earned an MPH/MBA degree) completed a summer internship with the Johnson & Johnson Global Commercial Strategic Organization.

OEHN faculty members continue to participate in multidisciplinary research. Manuscripts and abstracts have been accepted (or are in progress) from Dr. Fitzgerald's study, "Agonistic Stress and CVD Risk in Young Adults." Dr. Fitzgerald has also developed a collaboration with Marian House, a Baltimore non-profit organization that provides a structured living environment, education, employment readiness, and job placement for homeless and formerly incarcerated women. Dr. Fitzgerald is assisting the Marian House executive director and a specialist from the Maryland Department of Labor to design data analysis from records and surveys to evaluate outcomes such as employment after completion of this four-to-twelve-month residential program. An abstract, coauthored with a student, has been accepted for the 2014 APHA meeting. Four of our current graduate students have agreed to co-author, with Dr. Fitzgerald and Dr. Maureen Cadorette, articles for the Health Updates section of the journal *Workplace Health & Safety*, the official publication of the American Association of Occupational Health Nurses. Dr. Cadorette teaches the course *Fundamentals of Occupational Health*, which is offered both online and in class. This course, as well as Drs. Agnew and Fitzgerald's *Occupational Health of Vulnerable Worker Populations* course, are required components of the OEHN curriculum. Both courses receive positive reviews, and both are options in the department's certificate in Environmental and Occupational Health, which is directed by Dr. Agnew and is available to degree and non-degree students. The certificate can now be completed entirely online if desired. This is another way in which ERC teaching contributions benefit students beyond those who are part of the ERC, thereby exposing non-ERC students to occupational health and safety. We have also increased our involvement with the school's summer institute, in which our department was not previously involved. Dr. Agnew and Dr. Peter Lees offered a two-part version of their five-credit course *Occupational Health*, which included industry visits and had a focus on program development. Drs. Agnew and Fitzgerald participated in a joint effort between the Johns Hopkins School of Public Health and the School of Nursing to complete a self-study of the MSN/MPH program. Of the 155 students who have

completed the joint program, several were supported by the OEHN program and ERC funding. OEHN faculty and trainees had eleven peer-reviewed publications during this period. In other news, Dr. Fitzgerald, who chairs the disability subcommittee of the Johns Hopkins University's Committee on Equity, Diversity and Civility, received a Disability Innovation Grant to develop a photo bank of Johns Hopkins faculty, staff, and students with visible disabilities for use on university Web sites and other media formats. In May 2014, the Johns Hopkins Bloomberg School of Public Health honored Dr. Agnew with its highest honor for excellence in teaching, the Ernest Lyman Stebbins Medal. The School awards the Stebbins Medal to one faculty member each year for outstanding contributions to its teaching programs.

Occupational and Environmental Medicine Residency:

The Occupational and Environmental Medicine Residency has continued to attract highly qualified applicants, and we continue to have resident representation from underrepresented populations. The high caliber of our residents (five during this period) is evidenced by the Delta Omega Honor Society induction of our two second-year residents, while one of our first-year residents was already a Delta Omega member. In addition, an OEM resident was the 2013 recipient of the Randall Bass Award in the Johns Hopkins Bloomberg School of Public Health. During this reporting period, our residents have given numerous grand rounds and journal club presentations, and our residents attend and present at meetings of the local ACOEM chapter, MCOEM. We have developed working relationships with ILO and WHO, where residents have completed rotations for the past three years. With the added clinical time in the first year of the program, we have been able to increase clinical continuity, and our residents have spent several months in one-to-two-day-per-week clinics at the Johns Hopkins Hospital and in related research projects.

We have recruited Dr. Francesca Litow to the residency faculty, and she works with Dr. Schwartz as a co-director of the program. Dr. Litow completed her residency in OEM at JHSPH in 2000, and had an outstanding career as a Navy OEM physician including as director of the occupational safety and health branch at the Naval Hospital in Naples, Italy, where she was responsible for the occupational health of approximately 9,000 employees. From 2005-2007, she was the associate program director for the OEM residency at the Uniformed Services University of the Health Sciences (USUHS) in Bethesda, Maryland, and she maintains a faculty appointment as adjunct assistant professor in the Department of Preventive Medicine and Biometrics at USUHS. Since she left the Navy in 2007, she has continued to gain management and OEM expertise as director of the occupational health and travel clinic for Main Line HealthCare in Pennsylvania and, most recently, as the principal at Klein Occupational Medicine Consulting. Dr. Litow has been a valuable resource to the OEM residency for several years, and she has held an associate faculty appointment in our department since 2007. Prior to joining our residency faculty, she was chair of the Residency Advisory Committee for the OEM program. A nationally recognized speaker, president-elect of the Pennsylvania component of ACOEM, and an active consultant and clinician, Dr. Litow is a tremendous asset to our program. In addition, we have recruited Dr. Michael Sauri, director of Occupational Health Consultants, as a clinical preceptor. His clinic provides unique opportunities for residents to care for workers employed in a wide range of industries, including biomedical and animal research. He has years of expertise in the field and is boarded in internal medicine, infectious diseases, and preventive medicine. OEMR faculty had 15 peer-reviewed publications during this period, many of them co-authored by current and former trainees.

Biomarkers of Occupational Exposure and Susceptibility:

Our trainees continue to make progress toward their educational and research goals, and we have experienced a surge in applicants and participants during this reporting period. Five new doctoral students were admitted to begin in fall 2014. Three students graduated, and four are at various stages in their PhD programs. One had taken a two-year leave of absence for military duty. In many cases, we are able to leverage ERC funding to enable students to receive other forms of support, such as school scholarships and funding from other Johns Hopkins centers. In terms of contributions to regional and national needs, our graduates are prepared to enter research and teaching careers in a variety of settings, including academic universities, research institutes, governmental health agencies, and international health organizations. The majority of the research conducted by program faculty and students is related to one or more of the priority research areas identified by NIOSH in the National Occupational Research Agenda.

Program faculty demonstrated a high level of research productivity, as evidenced by published papers, review articles, and book chapters—many of which include students as authors. These publications are augmented by numerous presentations at national and international conferences and by participation on professional committees of national and international organizations. Program faculty also serve on numerous advisory committees (e.g.: the Molecular Epidemiology Group of the American Association for Cancer Research; the Johns Hopkins Center for Global Health; the Joint Geisinger-JHSPH Environmental Health Institute; and the Wayne State NIEHS Center External Advisory Board) and grant review panels (e.g.: EPA Science Advisory Board review panels; the New Jersey Commission on Cancer Research; and the Lymphoma Foundation of America). Dr. Strickland presented the keynote lecture at the 20th Asian Conference on Occupational Health in Bangkok, Thailand. Dr. Ana Navas-Acien continued to serve as a member of the WHO Expert Panel on Global Burden of Disease Caused by Lead and chaired a session at the Second International Congress on “Arsenic in the Environment – from Nature to Humans” in Taiwan. Dr. Brian Schwartz serves as co-director of the Joint Geisinger-Johns Hopkins Environmental Health Institute, and is a fellow of the Post Carbon Institute. Dr. Shyam Biswal is co-director of the new Indo-U.S. Center of Excellence for Environmental Lung Diseases.

Occupational Injury Epidemiology and Prevention:

In 2013, OIEP program director Dr. Keshia Pollack became associate director of training and education for the Johns Hopkins Center for Injury Research and Policy in the Bloomberg School of Public Health. Dr. Pollack continues to conduct occupational injury research involving: personnel from the U.S. Army; risk assessment and injury prevention among career firefighters; health, wellness, and safety among volunteer firefighters; injuries to professional athletes; and injuries to miners. She also continues her research work in transportation and policy, and she has begun new research in preventing pedestrian- and bicycle-related injuries. Dr. Pollack was appointed by the head of the U.S. Department of Health and Human Services to be a member of the NIOSH Safety and Occupational Health Study Section; her four-year term began in July 2014. During this reporting period, Dr. Pollack was also appointed to the Institute of Medicine/National Research Council Committee: A Framework for Assessing the Health, Environmental, and Social Effects of the Food System (2013-2014). She is the lead writer for the sections of the report on agriculture worker safety and health. Professor Sue Baker, the former OIEP program director, continues to conduct critical research in the area of transportation safety, namely focusing on injuries related to aviation. Dr. Renan Castillo and Dr. Stephen Wegener are

co-investigators on a multimillion dollar research collaborative supported by the Department of Defense, and Dr. Castillo is also a co-investigator on a project with the insurance company AIG. The specific aims of the AIG project are to use occupational claims data in order to identify areas where deviations from best clinical practices are resulting in increased costs for the company. This project has yielded several papers, and presentations from this work were made at the 2013 AcademyHealth Research Meeting. In addition to the core faculty, our program is strengthened by the active involvement of adjunct faculty members Dr. James Weeks and Dr. Robert Dodd. Both participate in the teaching program as course instructors and serve as resources to students during the research phase of their program. Dr. Dodd, who is employed at the National Transportation Safety Board, co-teaches *Policy, Politics and Transportation Safety* with Professor Baker and Dr. Pollack. Dr. Weeks is employed as Senior Health Specialist in the Office of Standards at the Mine Safety and Health Administration (MSHA), and participated on the MSHA panel to evaluate MSHA data on accidents and injuries.

During this reporting period, the OIEP supported four trainees. David Swedler successfully defended his dissertation in August 2013, and in September began the Liberty Mutual-Harvard School of Public Health Postdoctoral Fellowship in Occupational Injury and Disability Research. His dissertation on distracted driving among commercial truck drivers was accomplished in partnership with the Teamsters. Dr. Swedler submitted two abstracts from his dissertation for the 2014 American Public Health Association Meeting, which were accepted for oral presentations. He is also preparing the manuscripts for submission to peer-reviewed journals. Drs. Agnew and Pollack are coauthors on these products. Trainee Cassandra Crifasi (Kercher) guest lectured on interpersonal and workplace violence at Drexel University School of Public Health. Trainee Cassandra Crifasi was the recipient of the inaugural Susan P. Baker Scholarship in Injury Prevention. Trainee Meghan McGinty presented some of the preliminary findings from her dissertation research, on the response to Hurricane Sandy, in the course *Public Health and Disasters* at Johns Hopkins University. Ms. McGinty also received several awards: a Johns Hopkins University Environment, Energy, Sustainability and Health Institute (E2SHI) Fellowship; the Johns Hopkins Bloomberg School of Public Health John C. Hume Doctoral Award; and the 2013-2014 Lipitz Public Health Policy Award. Ms. McGinty also co-chairs the Student Involvement Committee of the Environment Section of the American Public Health Association, and serves as an advisory board member for the Public Health Policy Practicum, a Johns Hopkins Presidential PhD Innovation Initiative. OIEP students and faculty had nineteen peer-reviewed publications during this period.

Pilot Project Research Training:

We continue to broadcast our annual Pilot Project Research Training request for proposals to all NIOSH-supported institutions and other institutions engaged in occupational safety and health research in the region, and pilot project funding continues to provide research training for doctoral students (often providing data for their dissertations) and junior faculty (often providing preliminary data for other funding applications). Specific examples of the contributions of these projects to the health and well-being of workers is evidenced, in part, by the topics in the list (see below) of recent publications stemming from PPRT awards. In October 2013, RFPs were distributed via letters and emails to 41 program directors at 22 institutions within Region III. In response, we received 14 applications—seven from doctoral or post-doctoral students and two from junior faculty at the Johns Hopkins Bloomberg School of Public Health; three from junior faculty at Old Dominion University, Pennsylvania State University, and West Virginia

University; and one each from doctoral students at the Virginia Polytechnic and State University and the Indiana University of Pennsylvania. Of these, we selected five proposals for funding:

Name: Jesse Negherbon, BS, MEng
Status: PhD candidate, Johns Hopkins Bloomberg School of Public Health
Mentor: Patrick N. Breysse, PhD
Project title: *Total Pro-inflammatory Potential of Occupational Exposures to Agricultural Dusts*

Name: Nora Pisanic, PhD
Status: Post-doctoral fellow, Johns Hopkins Bloomberg School of Public Health
Mentor: Christopher Heaney, PhD
Project title: *Occupational Health Impacts of Zoonotic Pathogen Exposures among Swine CAFO Workers*

Name: David Swedler, MPH
Status: PhD candidate, Johns Hopkins Bloomberg School of Public Health
Mentor: Keshia Pollack, PhD, MPH
Project title: *A Mixed Methods Examination of Distracted Driving in Commercial Truck Drivers*

Name: Jeremy Gernand, PhD
Status: Assistant professor, Pennsylvania State University
Mentor: N/A
Project title: *Characterizing Ambient Background Nanoparticle Distributions in Workplaces*

Name: Kirsten Koehler, PhD
Status: Assistant professor, Johns Hopkins Bloomberg School of Public Health
Mentor: N/A
Project title: *Development of a Novel, Low Cost Sampler to Estimate Occupational Polycyclic Aromatic Hydrocarbon (PAH) Exposures*

Continuing Education and Outreach:

The Continuing Education training program serves as a regional educational resource for addressing occupational and environmental health and safety issues and the prevention of hazards that occur in the workplace. The CE program is an interdisciplinary effort coordinated across multiple departments at the Johns Hopkins University Bloomberg School of Public Health, and our faculty members represent the core areas of occupational and environmental hygiene and safety, occupational and environmental health nursing, occupational and environmental medicine, and occupational injury prevention, as well as biomarkers of occupational exposure and susceptibility and other specialty areas. CE Director Mary Doyle, RN, MPH, COHN-S/CM interacts with Abbott Laboratories and with the local chapters of the American Association of Occupational Health Nurses, the American College of Occupational and Environmental Medicine, the American Society of Safety Engineers, the Alliance of Hazardous Materials Professionals, the Washington Metropolitan Area Corporate Counsel

Association, the Public Employees Safety Association, and the American Industrial Hygiene Association. Online modules developed by ERC faculty for the Center for Public Health Preparedness continue to be well utilized by practicing professionals; to date, more than 6,000 people have viewed these modules with the opportunity to obtain CE credit. During this reporting period, our CE program reached more than 1,100 trainees. Faculty and program achievements, by OSH area, include:

Occupational and Environmental Hygiene

- The new one-day *Respiratory Protection and Respirator Fit Testing Workshop* was offered as part of our spirometry course offerings in October. Theory and hands-on-training on the use of quantitative and qualitative fit testing methods are included.
- Ms. Doyle is working with the Chesapeake chapter of the American Industrial Hygiene Association to promote the student section of this professional association. Last year, she served on the executive committee and coordinated ERC student poster sessions for the joint AIHA/American Society of Safety Engineers annual professional development conference, which provides opportunities for students and junior faculty to engage in public speaking and networking.
- The ERC co-sponsored three courses with the Mid-Atlantic Public Health Training Center during this period. *Investigating Public Health Complaints* and *Writing Skills for Environmental Health Professionals* were offered to public service employees, and we also worked with MAPHTC to hold a course celebrating Maryland's Public Health Nurses during National Nurses Week.
- ERC faculty ran 11 courses in our school's summer institute, which were offered for continuing education or academic credit.

Occupational and Environmental Health Nursing

- Three courses sponsored twice each during this period were: *Overview of Occupational Health Nursing*; *NIOSH Approved Occupational Spirometry and Refresher*; and *CAOHC Approved Occupational Hearing Conservation*.
- The ERC's Occupational and Environmental Health Nursing program has developed a resource book to supplement the *Overview of Occupational Health Nursing* course. Students utilize the contents as a study guide for preparing for the American Board for Occupational Health Nurses (ABOHN) board certification exam.
- Ms. Doyle collaborates with Abbott Laboratories' Global Occupational Health Services to provide online continuing education every other month.
- Dr. Fitzgerald is director of continuing education for the Maryland Area Association of Occupational Health Nurses, whose meetings are co-sponsored by this ERC.
- Ms. Doyle has provided leadership in planning programs for the Maryland Area, Seneca Valley, Metropolitan Washington, and Northern Virginia Associations of Occupational Health Nursing as noted in the CE Performance Data Tables. She attends many of their meetings, is currently serving on the planning committee for the 2014 biennial Regional Occupational Health Conference, and serves on the executive committee and as treasurer for the Metropolitan Washington Association of Occupational Health Nurses.
- The ERC was part of the planning committee for the Maryland's Public Health Nurses, National Nurses Week course *Training on Public Health Nursing History, Evaluation and Communication*.

Occupational and Environmental Medicine

- The ERC sponsored the 2013 international *Optical Radiation Workshop*. The topic—*Thermal Effects on the Anterior Segment of the Eye and Industrial Heat Cataract*—brought together physicians and researchers from the United States and Japan.
- The ERC co-sponsors *Occupational Medicine Update Series* with the Maryland College of Occupational and Environmental Medicine. MCOEM has identified interdisciplinary interaction as a goal, and the JHU ERC's CE program has been instrumental in fostering this interaction by marketing the conferences to regional occupational health nursing, safety, industrial hygiene, and environmental sanitation professionals.
- We have offered remote access to Maryland College of Occupational and Environmental Medicine conferences, so that participants may now attend via conference call with access to the speaker slides.
- Dr. Navas-Acien directed the Department of Environmental Health Sciences occupational and environmental health journal club. All program faculty participate in occupational medicine grand rounds, case presentations, and divisional research-in-progress seminars.

Occupational Injury Epidemiology and Prevention

- ERC faculty taught in the Center for Injury Research and Policy's *Principles and Practice of Injury Prevention* course in the 2013 summer institute. In addition, one term of the seminars sponsored by the Center for Injury Research and Policy was devoted to occupational injury prevention and was (and will continue to be) coordinated by ERC program faculty.
- The ERC planned and co-sponsored the joint American Society of Safety Engineers/Alliance of Hazardous Materials Professionals Professional Development Conference at Johns Hopkins University's Montgomery County campus in February 2014. Ms. Doyle served on the executive committee for this conference.
- We offered the four-day *Essentials of Hazardous Materials Management* course to prepare students to sit for the Certified Hazardous Materials Manager credential.
- Ms. Doyle is on the board of the Public Employees Safety Association and was responsible for planning and administrative support for the *Preparing for Winter Safety* conference in October 2013.
- Ms. Doyle was on the planning committee for the 24th annual Chesapeake Regional Safety Council Conference and Expo in October 2013, which had more than 300 attendees, and she also serves on the planning committee for the 25th annual CRSC Conference and Expo.
- This ERC continues as a National Center for Healthy Housing network partner. During this report period, we provided six healthy homes courses in cooperation with the University of Maryland Extension Service. In August 2013, we held the *Essentials for Healthy Homes Practitioner Course* for the District of Columbia Department of the Environment in Washington, D.C. Ms. Doyle also planned the *2014 Delaware Healthy Homes Summit* in cooperation with the Delaware Division of Public Health.